ON SCENE

THE NATIONAL MARITIME SAR REVIEW

DEPARTMENT OF TRANSPORTATION

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FIRST SAR ASSIST BY A VESSEL TRAFFIC CENTER

Vessel Traffic Center (VTC) San Francisco provided what must be a first in SAR assistance in November 1975 when it aided boats and helicopters in rendezvousing with a distressed vessel. This is the first incident of this type where the new vessel traffic services have provided a positive SAR assist. The following is a direct account taken from the narrative report provided by Commander, 12th Coast Guard District.

At 041533U November 1975 a distress call from the pleasure craft "KAHUNA B" was received on Channel 16 VHF-FM by the Vessel Traffic Center (VTC) San Francisco and the San Francisco Pilot Boat on station in the vicinity of the Large Navigation Buoy, San Francisco Bay approach. The KAHUNA B, a 36 foot Chris-Craft cabin cruiser with 4 persons on board, reported itself in need of assistance due to flooding and requiring medical attention for one of its passengers. Reported position was in the vicinity of South Channel Bell Buoy 2, off Flieschaker Zoo, San Francisco.

VTC immediately advised Group San Francisco of the distress and advised that the San Francisco Pilot Boat, en route to assist, was reporting zero visibility and calm seas. Group San Francisco assumed SMC but was unable to establish communications with the distressed vessel. VTC also advised that they held the distressed vessel on their Pt. Bonita radar.

At 1551U MLB 44385 got underway from Station Fort Point, at the foot of the south end of the Golden Gate Bridge, to assist. VTC was to vector it and the Pilot Boat to the scene of the distress. At this time there was no amplifying information as to the nature of the injuries or cause of the flooding aboard the KAHUNA B.

At 1600U the KAHUNA B radioed that it had a woman on board in severe pain with a probable broken hip. Group San Francisco requested an HH-52A helicopter from Coast Guard Air Station San Francisco via the San Francisco SAR Coordinator.

A few minutes later the KAHUNA B reported herself taking on water rapidly. At 1610U HH-52A 1391, equipped with portable pumps, departed Coast Guard Air Station San Francisco en route to the scene.

During the period since the first distress call VTC had established solid communications with the KAHUNA B, the San Francis-

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co Pilot Boat, Group San Francisco, and MLB 44385 on Channel 16. VTC provided magnetic vectors to the Pilot Boat and MLB 44385 to help locate the KAHUNA B.

Both vessels were equipped with radar but, without VHF direction-finding capability, were unable to determine which contact on their radar was the KAHUNA B. VTC placed a radarman on watch to vector the units together and to handle SAR communications. The watch supervisor manned the normal radar operator position.

At 1615U the CGC POINT HEYER got underway from Treasure Island Naval Station, en route to the scene as directed by the SMC. Her identification of radar contacts and location of the distressed vessel was assisted by VTC's range and bearing information.

Coast Guard HH-52A 1462, investigating a grounded sailboat in South San Francisco Bay off Foster City, was directed to return to the Air Station to pick up a litter and proceed to the KAHUNA B. CG 1462 arrived back at the Air Station at 1620U and departed, immediately thereafter.

At 1615U CG 1391 arrived in the general vicinity of the distress position. Departure from the Air Station, on the Bay side of the San Francisco Peninsula, had been unhampered by fog but the peninsula coast was enclosed in a large fog bank which necessitated the helicopters climbing to 1200 feet to get to the distress. CG 1391 began an instrument letdown coming into visual contact with the water at 150 feet but unable to get any attitude reference cues. They continued their letdown, commencing a visual descent at 40 feet, finally terminating in a 15-20 foot hover. She was then vectored to the KAHUNA B using magnetic bearings and ranges from VTC.

The Pilot Boat and MLB 44385 arrived on scene at 1640U finding about 3 feet of water in the KAHUNA B. MLB 44385, the Pilot Boat, and CG 1391 delivered pumps and personnel to the vessel to neutralize the flooding.

Crewman from MLB 44385 assisting in pump operation reported a woman passenger on board in severe pain with what appeared to be a broken hip. CG 1462 was notified of the situation and preparations were made for a hoist evacuation.

CG 1462 commenced descent into the fog at a distance of about 3 miles (TACAN range) from CG1391 and letdown to 30 feet before visually sighting the water. Descent was continued to an altitude of about 12 feet before visual cues were obtained, forward visibility being about 20 feet. She then commenced taxiing toward the vessel at 10-15 knots utilizing DF bearings off VHF transmissions from CG 1391 and radar ranges and magnetic bearings furnished by VTC. The DF Bearings and those given by VTC corresponded closely and gave a good check for CG 1462 to use in her approach.

To determine bearings and ranges for the helicopters VTC used its moveable cursor. By placing the stationary end on the helicopter display and aligning the moveable end to the KAHUNA B, VTC was able to read bearings in true degrees and distance in yards off the dial settings. By adding the local variation VTC was able to pass magnetic bearings and distance in yards (to the nearest 10) to the approaching helicopter. In comparison, bearings and ranges determined by TACAN and VHF-DF were considerably less accurate. Ranges from TACAN are good to only about one-half mile and useless for distance under three-quarters of a mile. Of course, DF bearings are relative and accurate to about $\pm$ 5 degrees.

Identification of contacts on VTC's radar was made by correlation of contact's movements in response to specific maneuvering orders by VTC. The disabled KAHUNA B, being the only vessel in the vicinity of the South Channel Bell Buoy 2, was easily identified on radar.

Radar acquisition of the helicopters at an altitude of about 300 feet permitted their identification as they descended through the fog in the vicinity of the distress. The rotating blades of the helicopters also permitted easy identification due to the unique radar display. Radar display of the helicopters was impossible while they were over land masses.

MLB 44385 took the KAHUNA B in tow astern as CG 1391 moved clear of the area to allow room for CG 1462 to attempt the hoist. At 1724U CG1462 lowered the litter to the vessel and the injured woman was strapped in. The hoist was completed at 1731U and both helicopters departed scene. After climbing through the fog layer CG 1391 returned to the Air Station and CG 1462 proceeded to Peninsula Hospital, Burlingame, California. The injured woman was conscious but in severe pain. Oxygen was administred by the crew en route to the hospital, where she was deplaned at 1740U.

The CGC POINT HEYER arrived on scene at 1818U, removed the remaining passengers from the vessel, and proceeded en route Station Fort Point. A second female passenger was reported suffering from a back injury of undetermined nature and an ambulance from Letterman Hospital, Presidio was requested to meet the POINT HEYER upon mooring.

The Pilot Boat secured from the case and departed scene at 1835U as MLB 44385 proceeded en route Fisherman's Wharf, San Francisco with the KAHUNA B in tow.

Arriving at Station Fort Point at 2045U, the CGC POINT HEYER disembarked her 3 passengers from the KAHUNA B, and proceeded to her mooring at Treasure Island Naval Station.

At 2145U MLB 44385 had to be relieved of tow by MLB 40463 from Station San Francisco, Yerba Buena Island, due to fouling of the towing hawser in her screws just off the entrance to St. Francis Yacht Harbor. MLB 40463 moored the KAHUNA B in St. Francis Yacht Harbor to await commercial salvage assistance the following day.

AURAL HOMING PATTERNS

As we pointed out in a recent issue of "On Scene", aural homing techniques are usually necessary in the initial phase of locating the source of an ELT or EPIRB signal. Reprinted herein are three aural search patterns recommended by the FAA. Two of these are variations on the HSM and HSA patterns of CG-308, while the third is not mentioned therein. They contain some different wrinkles which could be of value to SAR pilots.

Here are the reprints:

"Search Procedures.

(1) ..... One method requires a radio receiver equipped with a signal strength (AGC) meter. (Figure 1)

(a) Once the ELT signal is heard, continue your flight on the same course and note the readings on the signal strength meter.

(b) If the signal strength is increasing, continue on course. If the signal strength is dropping, make a 180° turn and fly back along the same track. In

most signal strength meters, the pointer will approach zero as signal strength increases and will read higher as the signal strength gets weaker.

(c) At some point along the original track, the signal strength will reach maximum (minimum meter reading) and then start to diminish. Make a 180° turn and fly back along the same track until you reach the point of maximum signal strength. At this point the ELT is either 90° to the right or 90° to the left of your position.

(d) Make either a 90° right or left turn and note the meter readings. If the signal strength diminishes you are flying away from the ELT. Make a 180° turn and fly back along the track. You will fly directly to the source of the ELT signal.

(e) Passage over the source of the ELT signal will be indicated by either a sharp rise in signal strength immediately followed by a sharp drop in signal strength or a complete momentary loss of signal. In some instances, the signal strength rapidly fluctuates between maximum and minimum several times before becoming steady again as the site is passed. These variations depend on the orientation of the ELT antenna after the crash and any unusual signal strength gyrations usually indicate passage over the ELT. If on approaching close to the source of the ELT signal your receiver appears to be saturated with the signal, turn your receiver to an adjacent channel. This reduces the sensitivity of your receiver to the signal.

(2) Another build and fade method can be used to locate the source of an ELT signal if your receiver is not equipped with a signal strength meter. This method takes a little more practice but is very effective and is illustrated in Figure 2.

(a) When the ELT signal is first heard adjust your receiver volume control for normal listening. Adjust your receiver squelch control to the point where it cuts off the audio and then back it off to the point to where the audio just cuts in. Note your position over the ground.

(b) Continue on the same course. If the signal from the ELT immediately cuts out you are flying away from the ELT. In this case, make a 180° turn and fly back along the same track. If the signal continues to be heard, you are in good shape. Continue along the same track until the signal cuts out (usually greater than 10 miles).

(c) Note your position over the ground when the signal cuts out, make a 180° turn and fly back along the same track. Half way between the points where you adjusted the squelch and where it cut out will be the closest point to the ELT along your original track. The ELT will be approximately 90° to the left or 90° to the right of this mid point.

(d) Make a 90° right or left turn and the signal will either cut off as you continue on the new heading or continue to be heard. If the signal cuts off you are flying away from the ELT. In this case make a

180° turn and fly back along the same track. This course should bring you approximately over the site of the ELT signal.

(e) To assist in pinpointing the ELT location it may help to tune your receiver to an adjacent channel (in the vicinity of the ELT) to reduce the receiver sensitivity on 121.5 MHz.

(3) There is still another search method that may be used to locate the general direction of an ELT signal and the general area in which the ELT is located. This method may be used when the receiving antenna is located approximately in the center of the wing span (either top or bottom of the airframe). It works most satisfactorily when the wings are all metal. (Figure 3).

(a) On hearing an ELT signal start a 360° turn to the left at a steep bank angle. At some point in the turn the receiving antenna will be in the radio shadow of the wings and the ELT signal will be lost. If the receiving antenna is top mounted, the right wing will point in the general direction of the ELT when the signal is lost. If the antenna is bottom mounted the left wing will point in the general direction of the ELT when the signal is lost.

(b) By repeating this procedure at locations about 20 miles apart, the general location of the ELT can be determined close enough to justify a concentrated search of the area."

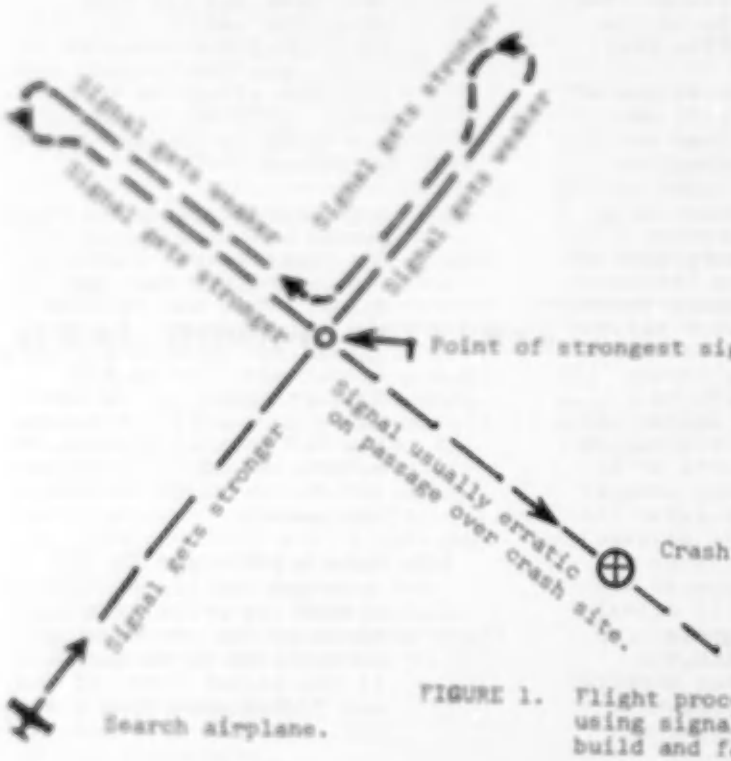

FIGURE 1. Flight procedure for locating ELT using signal strength meter. The build and fade method.

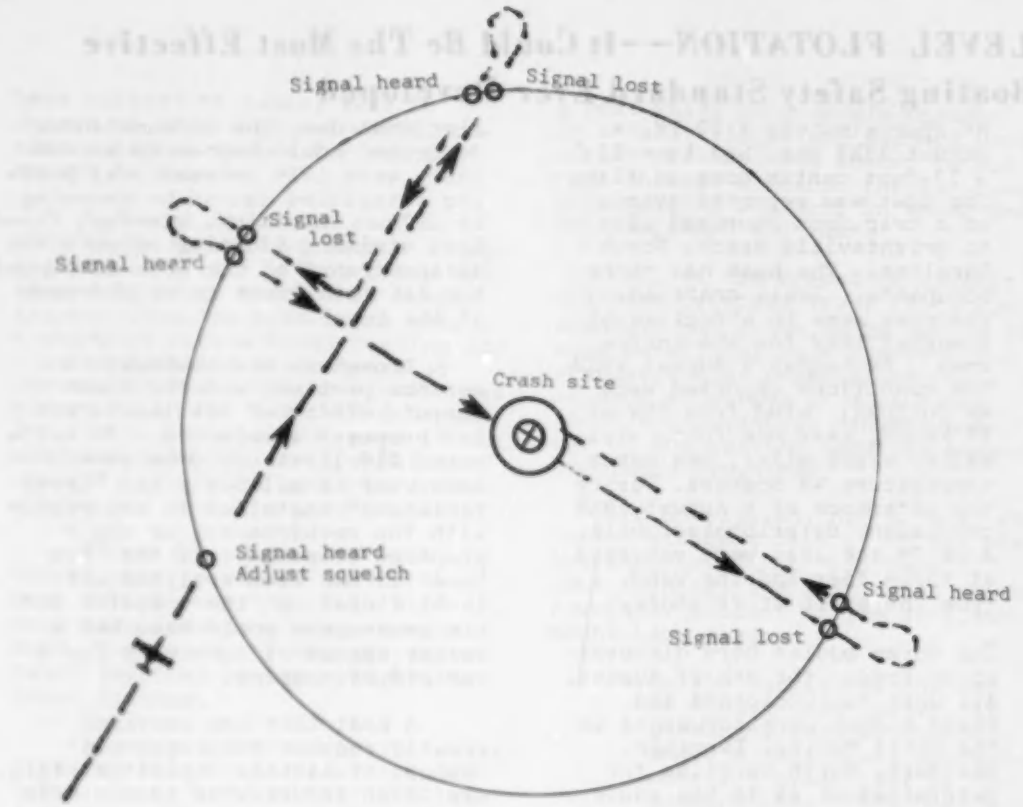

FIGURE 2. Build and Fade method of locating ELT using Squelch

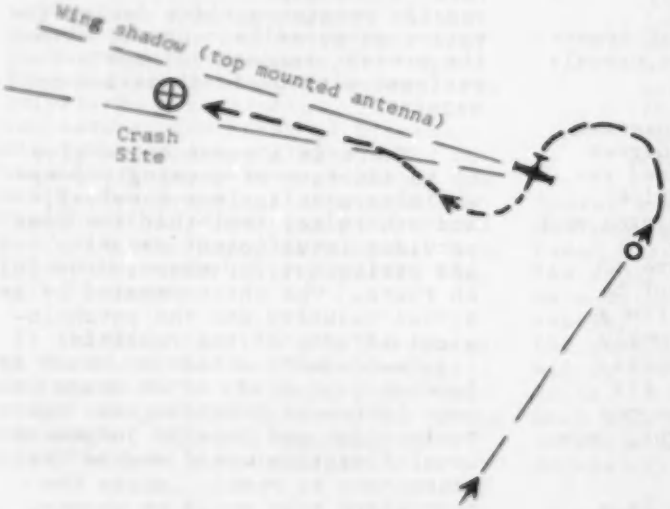

FIGURE 3. Wing shadow method of locating an ELT.

LEVEL FLOTATION--It Could Be The Most Effective Boating Safety Standard Ever Developed

At approximately 9:30 PM, 4 August 19XX the "Sea Lure II," a 17-foot center console fishing boat was reported overdue on a trip from Moorhead City to Wrightsville Beach, North Carolina. The boat had three occupants. Small craft advisories were in effect as of 3 August 19XX for the entire area. On Sunday 4 August 19XX the conditions reported were as follows: wind from SSW at 15 knots, seas one foot, visibility eight miles, sea water temperature 45 degrees. During the afternoon of 4 August 19XX conditions deteriorated until 8:00 PM the seas were reported at three feet and the wind from the south at 25 knots.

The three bodies were discovered on Friday the 9th of August. All were fully clothed and their bodies were forwarded to the Chief Medical Examiner, New Bern, North Carolina for determination as to the cause of death. Based on the findings of the subsequent investigation it was concluded that:

a. the victims died of drowning as a result of the casualty;

b. a contributing cause was the fact that the 45 degree F. water probably caused rapid unconsciousness which resulted in the drownings; and

c. the proximate cause of the casulties could not be determined, however, the available evidence strongly indicated that the vessel; while in strong winds (10 to 20 knots) and waves one to three feet in height, capsized and sank.

While the article above is a fictional one, the circumstances described could happen to anvone. There were 1314 recreational boating fatalities caused bv drowning in 1974. Capeizing, sinking, flooding, striking floating objects and disappearance of the boat accounted for 716 fatalities or 44 per cent of the total.

Drownings are obviouslv a serious problem, and the Coast Guard's Office of Boating Safetv has proposed a solution. An estimated 210 lives could be saved each year if all boats had "level flotation" installed in accordance with the requirements of their proposed standard. If the "Sea Lure II" had been enuipped with level flotation, tbe operator and his passengers would have had a better chance of surviving for a variety of reasons.

A boat that has capsized greatly reduces the survivors' chances of living. Spiritual failure often occurs when people have great difficultv hanging onto an overturned boat or just trving to stay afloat. A boat with level flotation swamps more slowlv and usually remains upright during the entire maneuver in contrast with the present tendencv of boats equipped with basic flotation to capsize.

There is a tendency to give up in the face of seemingly overwhelming odds against survival, and others may feel that the boat provides insufficient security and strike out for shore, drowning en route. The shock created by an actual casualty and the psychological effects of the realities of a life-or-death situation, such as immersion in cold, often rough waters increases psychological deterioration and impairs judgement. Level flotation would enable the passengers to remain inside the boat where they would be warmer,

less subject to panic, less in danger of drowning, and would provide a larger target for rescue groups to locate.

Personal flotation devices (PFD's) do not always save a drowning person's life. They often are stored in areas where they remain trapped when the boat turns over. A study of recreational boating accidents revealed that almost 56 percent of the fatality victims had access to a PFD, but failed to use it. It is obvious that even if the boat was swamped, if it remained upright, the PFD's would be accessible, and could be used properly.

Since the passengers will often be able to remain inside the boat during swamping, this will help save some people who cannot swim, who panic, or who are physically impaired by age, weight, or heart disease.

A study conducted by the Center of Naval Analyses of over 120,000 SAR missions between 1967 and 1969 determined that the average water temperature in fatality cases is 60.7 degrees F. One third or more of the drownings may involve "hypothermia" which refers to the moment your body begins to lose heat faster than it produces it. Prolonged exposure to cold water leads quickly to hypothermia. The interval between the onset of hypothermia symptoms and collapse might be only one hour, between collapse and death, two hours. If a person can remain within a partially submerged boat with the upper part of his body out of the water, his survival time will be longer.

In many cases if the powerhead of the motor has not been damaged by immersion in the water, the passenger may return safely under their own power. Also if the seas are calm the boat may be bailed out.

In terms of the number of manhours spent on SAR missions alone, a boat which will remain upright in a fully loaded and swamped condition will be much easier to locate than in a search for survivors of a boating accident in which the boat capsized and sank.

All of the preceding suggest that the proposed level flotation standard may prove to be one of the most beneficial boat construction standards ever promulgated. Once it is made effective it will bring about a substantial reduction in one of the boating safety's biggest problems--drownings.

In conclusion, had a level flotation standard been in effect when the men aboard the "Sea Lure II" went fishing, the conclusion to the newspaper account of the accident might have read:

> On the morning of the 5th of August Coast Guard SAR personnel located the boat and its passengers approximately 3 miles east of Masonboro Inlet. The boat's operator stated that while cruising in a following sea, a large wave broke over the transom swamping the boat. The fact that the boat remained floating in a level position, he further stated, made them feel as though they had a better chance of being spotted by rescue craft.

Editor's Note: Our thanks to the Boating Technical Division at Coast Guard Headquarters for this article. The level flotation standard will be a welcome weapon in the survival arsenal. Some boatmen have solved the problem of immersion hypothermia by investing in inflatable liferafts. A number of rescues have been made which would have been fatalities if it had not been for the availability of liferafts.

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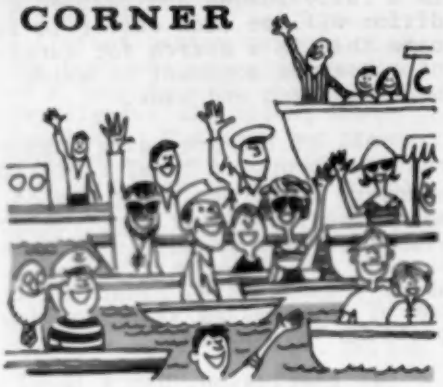

Some more satisfied customers wrote to the Commandant as follows:

".... while cruising off Annapolis, Md in my 33' power cruiser ... we discovered an apparently serious electrical fire .... We immediately secured all power .. and called for Coast Guard assistance ... within a short time, the smoke and fumes abated ... but without power and afraid to restart the engines, we were forced to anchor. Coast Guard Station, Annapolis ... had responded immediately and advised that help was on the way. In a matter of minutes CG-41311 was on the scene and had us in tow ... My purpose in writing ... is to commend the alacrity and skill with which the incident was handled by the Coast Guard personnel involved... The crew of CG-41311, consisting of BM3 Meurer, FN Brodsky and SA Bowman demonstrated not only excellent seamanship and boat handling but were most courteous and understanding..." /S/ John W. Lynch, Associate Director, U. S. Naval Investigative Service.

"This is to bring to your attention the actions of Chief Warrent Officer Robert A. Buotte and Seaman William J. Lockhead of the Point Allerton Coast Guard Station in regard to the rescue at sea of Robert Edward Stewart .... Stewart was in Federal custody ... when he fled and jumped into Quincy Bay. The quick response and subsequent actions of CWO Buotte and Seaman Lockhead determined Stewart's location and he was quickly rescued, Brian W. Neagle and George A. Bristol, now discharged also assisted in this rescue ..... /S/ Clarence N. Kelley, Director, Federal Bureau of Investigation.

"I am writing to commend to you the Coast Guard personnel at the Hampton Roads, VA base as well as those aboard the Cutter POINT BROWN ..... after losing our heavy sails one by one and encountering engine trouble we were forced to request Coast Guard assistance ... with only a storm trysail and no real maneuverability in a very nasty, confused sea and winds of 25 or so knots they (POINT BROWN) managed to come alongside, send over a messenger line, then a bridle and hawser and tow us for 15 or so miles with no damage ... The 40 footer which met us and got us into the dock was similarly skilled .... We greatly appreciate all the assistance that was rendered to us ... /S/ Virginia C. Jores, Owner (for myself, the Captain, and crew).

"As a foreign correspondent in this country I have appreciated for some years now the generous cooperation and help of the Coast Guard while reporting about ship disasters and other incidents ... nowever, on this occasion, I would like to express my deep gratitude towards your men for their assistance in a personal matter. While sailing my sloop NORDLYS along the Atlantic coast ... I was forced twice to ask the Coast Guard for help ... In both incidents the U. S. Coast Guard extended immediate and generous help to me and my crew. Moreover, we experienced a friendliness and courtesy by your men which will not easily be forgotten... please relay this 'thank you very much, fellows' to the personnel at Coast Guard Stations in Montauk (NY) and Cape Charles Harbor (VA) ..... /S/ Jergen F. Horsch, German Press Agency.

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